

MINISTRY OF
TRANSPORT AND CIVIL AVIATION

The Victoria Line

*Report by the London Travel Committee
to the Minister of
Transport and Civil Aviation*



LONDON
HER MAJESTY'S STATIONERY OFFICE
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LONDON TRAVEL COMMITTEE

*Report to the Rt. Hon. Harold Watkinson, M.P.,
Minister of Transport and Civil Aviation,*

on

THE VICTORIA LINE

(1) In its terms of reference you asked the London Travel Committee 'to consider and set in train where practicable further measures, including staggering of working hours, so as to relieve congestion at the peak periods on:

- (a) roads within and leading into and out of Central London;
- (b) services to and from Central London provided by London Transport and British Railways'.

You also asked the Committee to recommend to you 'any measures to further these objects which the Committee consider desirable but are themselves unable to initiate'.

(2) At its first two meetings, when it surveyed the travel problem in London and its complex series of component problems, the Committee was impressed by the major part played by the Underground and surface railway services in providing for peak hour demands and decided to investigate further how these services could be better fitted to carry passengers more speedily and in less congested conditions. Seeing that British Railways are now implementing various modernisation schemes on their suburban lines in London, the Committee turned its attention to London Transport's rail services and to the Victoria Line scheme, which had been considered in the past by expert committees, for example the London Plan Working Party and the Chambers Committee of Inquiry into London Transport, and put forward by them as the most urgent and desirable work of new tube railway construction which would at the same time enhance the value of the Underground.

(3) In February 1959, the Committee appointed a working group with the following terms of reference:

'Within the terms of reference of the main Committee, to consider the desirability, practicability and economics of further underground and surface railway construction on routes to, from and within Central London'.

The detailed examination of the proposals for the Victoria Line has been carried out by this working group assisted from time to time by officials of your department and of the Road Research Laboratory. The working group, through two of its members, has been provided with detailed information by London Transport and British Railways. In addition it has met representatives of local authorities from the areas which would be served by the Victoria Line and has examined suggestions from private individuals.

(4) The Committee considers that any investigation of the case for or against the Victoria Line must take into account the present and expected future pattern of travel in London. We have therefore examined not only the plans for the Line but also the general picture of London's travel facilities and Londoners' travel habits. The first part of this report deals with this background; the second describes the Victoria Line and the benefits that it is expected to provide; the third, the estimated traffic and financial results of the Line; the fourth, engineering and other factors affecting construction; and the fifth compares the Line with other possible objects of investment to help travel conditions. Our conclusions are in Section VI.

I. TRAVEL IN LONDON

(5) Public transport (apart from taxis and a few bus services) in the London Passenger Transport Area is provided by the British Transport Commission, which is responsible for providing an adequate and properly co-ordinated system of passenger transport in that area, which covers some 2,000 square miles and has a total population of just over 10 million. In effect this responsibility is delegated to the London Transport Executive, with its road and Underground services, and to British Railways, with their surface suburban passenger railway services. In terms of passenger-miles¹ over the whole day, British Railways in 1957 carried about 31·7 per cent of the traffic offering, London Transport road services 46·6 per cent and the Underground 21·7 per cent. The corresponding figures for 1958, when travel was affected by the bus strike, are 35·4 per cent, 40·6 per cent and 24·0 per cent. In terms of passenger journeys² the figures show a different pattern. Thus, in 1958, British Railways carried 14·2 per cent, road services 67·1 per cent and the Underground 18·7 per cent. The corresponding 1957 figures are 11·7 per cent, 72·7 per cent and 15·6 per cent. The main broad conclusion to be drawn from these figures is that, while buses carry more passengers than the railways, they do not carry them so far. The bus and the train are accordingly complementary parts of London's passenger transport system.

Road Services

(6) Buses, the Underground and surface railways have their own special advantages and characteristics. Of the three the bus is the more flexible, since it can run wherever there is a suitable road and can pick up and set down passengers at frequent intervals. The bus is accordingly well suited for short distance traffic and in fact nearly one half of the passengers on London's central buses and trolleybuses travel for distances up to a mile, and over one third of them for distances of no more than half a mile. But in carrying out their regular operations bus services to-day suffer from several handicaps, not the least of which are the delays due to traffic congestion. The average scheduled speed of the buses in inner central London is under 10 m.p.h. compared with an average scheduled speed of 20 m.p.h. on

¹ Passenger-miles are obtained by multiplying the number of passengers carried by the distance they travel.

² A passenger journey is one journey by one passenger on one form of transport.

the Underground. In these circumstances many potential passengers, especially over the shorter distances, find it quicker and more convenient to walk. This is one of the reasons for the drop in bus peak hour traffic over the past few years. This reduction is likely to continue unless steps are taken to restore the attractiveness of the bus by reducing traffic congestion and thus enabling it to run more regularly and speedily than at present. At the same time, fewer Londoners are now using bus services between the peaks, in the evenings, and at week-ends. This is one result of the growing ownership of cars, motor-scooters and television sets—the family now uses its own transport for week-end travel rather than the bus, and stays at home in the evening for its entertainment. This week-end and evening reduction in the number of passengers is likely to continue in the future; there is certainly at present no sign of a reversal of the trend. Furthermore it is significant that there has apparently been a permanent loss of bus traffic following the seven-week strike just over a year ago.

(7) Not all bus travel, however, is for short distances, and London Transport's Green Line coaches carry medium distance traffic on routes which link the outer sections of the London Transport area with central London and serve the areas that cannot be reached conveniently by suburban railway services. The use made of these coaches is good, and they provide a very convenient service in that they can carry passengers, without the need for them to change, from the country and outer suburbs into and across the heart of the town. But they are not and can never be a serious competitor to peak suburban railway travel, for they cannot handle large surges of passengers such as occur at peak times.

The Underground

(8) The Underground is a relatively fast form of transport, with a high degree of regularity, catering mainly for medium distance traffic, but also acting in central London as a distributor of traffic including that passing through the main line termini. In common with surface railways, it can and does move large numbers of passengers in a short time and is an ideal form of transport to handle heavy peak hour surges. Unlike the buses, use of the Underground has held up well in the last few years, and indeed the number of passengers using it over short distances has increased noticeably over the last two years. The Underground system in central London, however, was not planned systematically—it is the result of an amalgamation of various lines built by different companies before 1914 to meet particular traffic needs—and this, coupled with changing travel flows and the fact that there has been no tube construction in central London for over fifty years, has produced the situation that there is no convenient

direct Underground link between several important points in the central area. Several stretches of the Underground are grossly overcrowded at the peak hours and require urgent relief. London Transport are tackling this problem at present with orders for new rolling stock to give more room for passengers on the Piccadilly, Central and Circle Lines. They are also completing the pre-war plans for extending the electrified section of the Metropolitan Line, providing new rolling stock, and making it possible by doubling its tracks for more frequent and faster services to be provided north of Harrow.

Surface Railways

(9) The surface railways provide the fastest service into central London from the outer suburban areas and beyond. These services are most highly developed south of the river, where the network of electrified lines running into Waterloo, Victoria, Charing Cross, Holborn Viaduct, Cannon Street, and London Bridge stations is used practically to full capacity at peak hours. North of the river electrification is not so extensive, but is spreading as British Railways' modernisation schemes are completed. The Liverpool Street/Shenfield line was electrified in 1949 and extended to Chelmsford and Southend (Victoria) in 1957; a further extension to Colchester, linking with the line to Clacton which is already electrified, is expected to be completed in 1962. Before then, the lines from Liverpool Street to Enfield Town, Chingford, Hertford East and Bishops Stortford will have been electrified in 1960, and the line from Fenchurch Street to Tilbury and Shoeburyness in 1961. British Railways' modernisation plan also includes proposals to electrify the Great Northern Line suburban services to Hertford North in 1962-63 and the line to Hitchin and round to Letchworth in 1963-64. In the meantime improved diesel services have recently replaced the steam trains. Subsequently the outer suburban services of the London Midland Region between Euston and Tring will be electrified as part of the major scheme of main line electrification to Manchester and Liverpool.

(10) Electrification cannot be justified on all lines—it requires a certain minimum amount of passenger traffic to make it pay—and on the remaining suburban lines, which are not to be electrified, British Railways have plans for the replacement of steam trains by diesel services. The first of these is the Midland line between St. Pancras and Bedford, on which the full improved diesel services will be introduced next January. The substitution of diesels for steam will shortly start on the Western Region suburban services into Paddington and subsequently on the Marylebone/High Wycombe service.

(11) Within a few years, accordingly, surface railway services north of the river will have been modernised and greatly improved in

frequency, reliability, attractiveness and capacity, and British Railways confidently expect that they will be used by many more passengers. Past experience of electrification amply bears this out. But this increased use will bring with it an additional problem—that of the onward distribution of passengers over inner central London from the terminal stations, which all lie on the outer fringes of that area. This problem has existed for some years but it has recently been accentuated by three factors—first, the increasing pressure on the public transport system at the peak hours; second, the spread of business activity in central London from the City to the West End allied with a growing working population in the inner central area; and third, the altered travelling habits of the population of the Greater London area, which are the result of outward movement of residential population within that area.

Peak Hour Travel

(12) All London's public transport services have a problem in common—that of coping with the short but very heavy tidal surges of workers pouring into London in the morning and flooding out again in the evening. Public transport carries about 1,150,000 passengers into central London between 7 a.m. and 10 a.m.—nearly 600,000 arrive in the hour between 8.15 a.m. and 9.15 a.m. In the evenings between 4.30 p.m. and 7.0 p.m. some 1,050,000 workers leave central London—620,000 between 5.0 p.m. and 6.0 p.m. Pressure on the public transport system at the maximum peak hour, especially in the evening, is intense, and is increasing on the suburban and Underground railways, which carry just under 80 per cent of the peak traffic. Peak bus traffic, as we have noted in paragraph 6, has in recent years tended to decline.

Travel to the West End

(13) Over the last thirty years the West End of London has largely ceased to be a residential area and is now predominantly a business and commercial quarter. This trend was accentuated by the wartime destruction in the City, and over the last twenty years has shown itself in an increase in suburban rail traffic to Victoria and Charing Cross. The number of passengers arriving at Victoria in the heaviest hour in the morning peak is now double what it was in 1939. But the means to carry these passengers onwards by Underground have not kept pace with the growth. The West End has no direct Underground link with Victoria. The links between the West End and Euston, King's Cross and St. Pancras are crowded and some involve changing trains.

Population Movements

(14) The resident population of the London Transport area (just over 10 million) is a little larger now than before the war, and at present is planned to rise to some 10,330,000—an increase of about 3 per cent over the present figure—by 1971. But this overall assessment masks the very substantial changes that have already taken place or have yet to take place in the distribution of population. The population in central London and in the inner boroughs has declined, while that in the outer areas has risen, and is expected to continue to do so. This shift has already shown itself on the railways, for the average length of journey on the Underground has risen compared with before the war, and passenger traffic on British Railways suburban lines has grown. We expect that this trend will continue, particularly on the latter services, because of the extent to which they serve the outer country ring, where the population is planned to increase by as much as one quarter over its present level.

Standards of Comfort

(15) In examining the general travel picture we thought it desirable to try to establish some yardstick for measuring passenger comfort on the railways. Much that is said about providing passengers with a more comfortable journey is meaningless unless it is related to some easily understood measure. Clearly, the ideal standard is that every passenger should have a seat at any time of the day. But it is equally clear that this standard is not attained in London at the peak travel periods, although generally seats are available for all at other times. Most of the Underground lines and many surface lines are already worked to the limits of their track capacity, so the problem cannot be solved by increasing services there. Also, at peak times it is hard to see how it can be an economic proposition to provide every passenger with a seat; to do this would require in many sectors the provision (at enormous cost) of additional Underground and surface tracks, together with rolling stock and staff which could never be fully employed outside the peak hours. We have tried to establish in the first place a figure to measure the excess of passengers over seats which could be accepted as tolerable on the Underground. We think that this overload figure over the whole train for the Underground is of the order of 125 per cent, i.e., for every 100 seated passengers there are 125 standing. At this standard, passengers have sufficient space to stand without jostling each other unless they voluntarily choose to crowd into one part of the train or coach. But while this overload figure may be tolerable for distances of, say, two to three miles, we feel that over longer distances an overload of 100 per cent would be more nearly acceptable.

(16) This overload is already exceeded on certain stretches of the Underground. For example, on the Central Line eastbound between Bank and Liverpool Street the overload at the height of the evening peak is at present of the order of 130 per cent to 140 per cent. On the eastbound section of the Piccadilly Line between Leicester Square and Finsbury Park the peak overload during the maximum 20 minutes is never less than 125 per cent and on the section between Holborn and Holloway Road it is between 145 per cent and 160 per cent. Similarly, on the westbound section of the Piccadilly Line between Leicester Square and Gloucester Road the peak overload for the 20-minute period of maximum pressure is at least 140 per cent throughout, and at Piccadilly Circus is as high as 155 per cent. Such conditions are clearly intolerable, and call for remedy. The provision of new rolling stock, which is now in hand, for the Piccadilly and Central Lines will help to some extent by increasing the passenger accommodation by up to 15 per cent compared with the trains they will displace, but it is not a complete solution.

Private Car Travel

(17) Passenger congestion on the Underground is matched by vehicle congestion on the roads. This requires no statistical demonstration; it is too well known to require proof of its existence or origins. There are several ways in which road congestion can be fought—by clearing valuable road space of parked cars and so allowing traffic to flow more freely, by selective road improvements to ease intersections which cause particular difficulty and by persuading road users to travel by alternative routes. While the first two methods are valuable, we feel that they are likely to be inadequate, given the amount of money likely to be available for road improvements in foreseeable circumstances and the ever-increasing number of road vehicles.

(18) In September 1955 there were just over 800,000 private cars licensed in the London Transport area. By September 1958 there were some 1,050,000, an increase of 31 per cent. Between 1957 and 1958 the annual increase was some 8 per cent. We have no reliable statistics to show the growth since September, 1958, but it is more than likely that the rate of increase will be sharply stepped up as a result of the removal of hire purchase restrictions in October last year and the reduction of purchase tax in the Budget this year. The increase in car registrations is reflected in the biennial road traffic censuses taken by the Metropolitan and City of London Police. If the number of cars entering the central area in 1939 is taken as equal to 100, by 1952 it had risen to 106 and by 1958 to 156. Since 1952, therefore, there has been an increase of 50 per cent in private car traffic entering central London. At present some 50,000 cars enter

central London every working day between 7.0 a.m. and 10.0 a.m. The average car load is 1.5 passengers, which gives a daily total of some 75,000 persons who travel to work by private car. Out of a total of just over 1,200,000 workers who travel daily into London by private car and public transport, car users represent about 6 per cent.

(19) Many of the cars which enter central London every working day subsequently park all day in the streets. We have noted that it is now an integral part of traffic policy for London that indiscriminate street parking should be controlled by parking meter schemes. But while these schemes are useful—we might say necessary and indispensable—for clearing the streets of parked cars which hinder the free circulation of traffic, it is undeniable that users of private cars who lose free and convenient parking by these schemes (which will almost certainly spread in future) will have to rely more and more on public transport for travel to work and within central London. We think that this result of parking control should not be overlooked.

The Present Position

(20) The outstanding feature of travel in London, then, is the large number of workers flocking in and out of the central area in very heavy but short surges in the morning and evening. These surges are becoming more concentrated. The result is congestion on the public transport services and roads. Travellers are coming into London from longer distances by surface railway and more are making for the West End, which is relatively poorly served by rail transport. We see no real prospect that the measures now in hand will sufficiently relieve congestion on the Underground in the central area, or that the road system, at its present rate of expansion, could provide a measure of relief to solve the large scale problems of congestion which will become more acute in future. It is likely that, with the gradual spread of parking controls, more and more private car owners will in future return to public transport for the journey to work, and for travelling about central London.

(21) It is with this background in mind that we have considered the detailed proposals made by London Transport to construct the Victoria Line.

II. THE VICTORIA LINE AND ITS EFFECT ON LONDON TRAVEL

(22) The Victoria Line would run from a new underground station at Victoria to the existing surface station at Wood Street, Walthamstow, on the Eastern Region Chingford Line. It would be $11\frac{1}{2}$ miles long

and except for a short length near Wood Street would be entirely in tube. The Line would have thirteen stations—Victoria, Green Park, Oxford Circus, Warren Street, Euston, King's Cross/St. Pancras, Highbury, Finsbury Park, Seven Sisters, Tottenham (Hale), Blackhorse Road, Walthamstow (Hoe Street) and Walthamstow (Wood Street). Eleven of these stations would provide interchange facilities with other Underground and surface railway lines. (The map in Appendix I shows the Line and its connections.) There are several features of the Line that are worth noting. First, it would connect with every other line of the Underground. Second, its connections with the suburban railways would link it to routes which are either already electrified and carry heavy traffic or which are to be electrified and are expected to increase their traffics considerably. Third, by running in a south-west/north-east direction it would fill a gap in the Underground system in Central London, where the other lines, roughly speaking, run east/west, north/south, or north-west/south-east.

(23) The main benefits of the Line may be summarised as follows:

- (a) it would provide a new direct link between British Railways' main line terminus at Victoria and the West End;
- (b) it would provide a new direct service between Victoria and the northern main line termini at Euston, King's Cross and St. Pancras, and between these northern stations and Oxford Circus;
- (c) it would provide a new direct connection between the north-eastern suburbs of Walthamstow and Tottenham and the West End, and through convenient interchange stations between Enfield, Edmonton, Chingford and the West End;
- (d) it would provide faster travel between various points in Central London;
- (e) it would relieve the intense pressure on other Underground lines at peak times;
- (f) it would provide easy and attractive interchange facilities with other lines.

The following paragraphs consider these benefits in greater detail. Appendix II shows them in a diagram.

Links between Victoria and the West End

(24) Although there are three routes open to him, the passenger arriving at Victoria has no convenient way of reaching the West End. If he goes by rail he must travel on the District Line (which is heavily loaded with passengers from the western suburbs) and change at Charing Cross on to the Bakerloo Line, which handles heavy traffic from the main line stations at Waterloo and Charing Cross. If he goes by bus, he has to make a long detour round the Royal Parks. The

third route lies directly across the Royal Parks, but in this case the passenger has to walk. The Victoria Line would alter this state of affairs entirely, since it would provide a direct connection with the West End at Green Park and Oxford Circus stations. And it would be a quicker journey too. For example, the journey between Victoria and Green Park which takes 20 minutes on foot would take about 5 minutes from street to street on the Victoria Line. The need for the Line is emphasised by the facts that, as we noted in paragraph 13, main line rail traffic into Victoria during the peak hour has more than doubled since before the war and that at present 50 per cent of the morning peak hour traffic into Victoria is taken farther by public transport; the remainder, with few exceptions, walk.

Links between Victoria and Euston, King's Cross and St. Pancras

(25) At present a traveller using the most direct Underground connections between Victoria and the northern main line termini at Euston, King's Cross and St. Pancras has to change. There is no direct way of reaching parts of the West End from these three northern stations. King's Cross and St. Pancras, it is true, are served by the Piccadilly Line but this is already heavily overloaded at peak times. From Euston the most convenient link is by Northern Line to Leicester Square, which is only on the fringe of the West End area proper. There is a further argument for the Line. The number of suburban railway passengers using these northern stations is well under half that using Victoria, but it is expected to increase substantially over the next few years as the main line services into Euston and the suburban services into King's Cross are electrified and the St. Pancras steam services are turned over to diesel traction. The need for more Underground facilities to assist in onward distribution from these stations will accordingly become more urgent as the use of the remodelled services builds up.

Links between north-east London and the West End

(26) The Victoria Line would give the north-eastern suburbs of Walthamstow and Tottenham a direct link with the West End. Also, since the Line connects with the British Railways suburban lines between Liverpool Street and Chingford, and Liverpool Street and Enfield Town, it would provide a convenient West End route for passengers from Chingford, Edmonton and Enfield. There is a need for this direct connection. The two existing routes into the West End from these areas both require the passenger to change. One route, by British Railways suburban service via Liverpool Street and the Central Line, is roundabout and the Central Line itself is filled to capacity at peak hours. The other route, by bus or trolleybus to

Manor House and thence by the Piccadilly Line, is equally inconvenient and crowded, for the Piccadilly Line trains are full when they arrive at Manor House. The latter route is at present the more popular, but London Transport estimate that probably half of the large numbers of passengers using the Manor House interchange would find travel by Victoria Line quicker and more direct. The electrification of the suburban rail services into Liverpool Street from the north-eastern suburbs, which is expected to be complete in 1960, will not provide a suitable alternative, for it will not relieve congestion on the Central Line; indeed, with the expected increase in the number of passengers using the electrified services it is quite likely to make it worse. Bus services between the north-eastern suburbs and the West End do not to-day, and could not in future, provide a suitable link; they are too slow compared with the Underground and are liable to be held up by traffic congestion.

(27) The north-eastern suburbs are the only sectors of London which at present do not have direct rail routes to both the City and West End. The City connections already exist and the Victoria Line is the best solution to the problem of providing the north-east with its West End link.

Faster Travel

(28) By filling in the gaps in the Underground system in Central London, the Victoria Line would provide faster services between points served by the existing Underground lines and bus services. London Transport have worked out the following broad comparisons between actual running times by existing services and estimated running times by Victoria Line after making allowances for entering and leaving stations and changing, where necessary, from one train to another, but not for waiting for a train or a bus. Travelling by the District and Bakerloo Lines, a journey between Victoria and Oxford Circus takes 17 minutes; from street to street by Victoria Line it would take 8 minutes. From Victoria to Euston by District and Northern Lines takes 19½ minutes and the same trip by bus takes 27 minutes; the Victoria Line would cut this to 11½ minutes. Journeys from King's Cross and Euston to Oxford Circus, which take 14-15 and 12-15 minutes would be cut to 9 and 7½ minutes respectively. Finally, by having fewer stations than the Piccadilly Line between King's Cross and Finsbury Park, the Victoria Line would be faster over that stretch.

Relief of Underground Congestion

(29) We have already noted in paragraph 16 that some stretches of the Underground are loaded at peak times beyond the level we consider reasonable for passenger comfort. By providing faster and more

direct services the Victoria Line would certainly attract passengers from other parts of the Underground system—indeed, London Transport have estimated that about one-third of the Line's traffic would be drawn from other lines—and so relieve the heavy pressure on them. Thus, the evening peak overload on the eastbound Central Line between Bank and Liverpool Street would be reduced to less than 100 per cent. The reduction on the eastbound section of the Piccadilly Line would be even greater, for except at Leicester Square and Covent Garden, where it would be just over 100 per cent, the overload would come down to well below 90 per cent. These figures are within the limits we consider reasonable for peak hour travel. The Piccadilly Line west of Green Park will not be affected by the Victoria Line and there will still be an overload at the height of the peak, but only over a very short distance. In terms of numbers of passengers carried every year the load on the Piccadilly Line as far north as Finsbury Park should fall from 40 million to under 32 million. On the District Line between Victoria and Charing Cross traffic should fall from some 44 million to about 30 million, i.e. by about one-third.

Interchange Facilities and New Stations

(30) Eleven of the Victoria Line's 13 stations will provide interchange facilities with other Underground or suburban surface lines. We would like to draw attention to the fact that at four of these stations—Oxford Circus, Euston, Finsbury Park and Walthamstow (Wood Street)—some or all of the interchange facilities will be cross-platform interchange. This is an extremely attractive and easy way of changing from one line to another—the passenger merely steps out of his train and walks across the platform for his connection. London Transport have developed this facility wherever possible—it operates, for example, at Stratford, Mile End, Hammersmith and Finchley Road stations—and it has fully justified itself.

(31) Construction of the Line would also involve the rebuilding or alteration of existing stations, and this, by providing extra facilities for passengers, is an important part of the Line's attractions. At Victoria, for example, there would be a new sub-surface ticket hall, with escalator and subway interchange with the District and Circle Line platforms and with the Southern Region terminus. At Oxford Circus the existing station—to-day quite inadequate at peak times—would be reconstructed, enlarged and would provide pedestrian subways under the road surface. At Euston the station would be rebuilt and the lifts replaced by escalators. At King's Cross/St. Pancras the existing ticket hall would be enlarged and at Highbury the lifts would be replaced by escalators. There would be new stations at Seven Sisters (where again there will be a new pedestrian subway below a

busy road junction), Tottenham (Hale), Blackhorse Road and Walthamstow (Hoe Street), and at Walthamstow (Wood Street) the existing Eastern Region surface station would be reconstructed. (Fuller details of the new interchange and station facilities are in Appendix III).

Relief of Road Congestion

(32) So far in this section we have considered the direct benefits that the Victoria Line would confer on its passengers. These can be measured. It would also produce indirect benefits. By providing faster and more direct travel between north-east and central London, and by providing a better onward service for passengers from Victoria, the Line may well attract passengers who at present travel by car into central London from the north-east and the south. This benefit, however, cannot be illustrated statistically, for the basic data for doing this do not exist. There are no reliable figures for the number of cars that come into central London from the north-east and southern suburbs every day, nor do we know whether travellers who arrive in cars from these areas would personally find travel by the Victoria Line less expensive or more convenient.

(33) London Transport, we were informed, have worked out comparative journey times by rail and road from several points in the suburbs to Oxford Circus. In doing this they assumed that a traveller uses a 10 h.p. car and, if travelling by rail (including the Victoria Line), uses the most direct route. For the car trip they assumed an average speed of 20 m.p.h. and times of 5 minutes for taking the car from its garage, parking and walking to the office, 5 minutes for central area road congestion to the north of Oxford Circus and 10 minutes to the south of Oxford Circus. The results on these assumptions showed that a traveller by rail to Oxford Circus from Chingford would save 5 minutes over a car journey, from Walthamstow (Hoe Street) 3 minutes, and from Seven Sisters, 2 minutes. From Sutton he would save 7 minutes, from East Croydon, 11 minutes, and from Bromley, 4 minutes. From Lower Edmonton he would save 1 minute travelling by road. Travel by Victoria Line is, on those figures, generally faster.

(34) These results are interesting, but they were worked out on certain arbitrary assumptions and so cannot be regarded as clinching the argument. We have therefore tried to view the Victoria Line against the future use of private transport. At present, travel by private car and motor scooter is increasing. But this brings with it increased congestion on the roads and it is likely that, if this continues to grow, some travellers at any rate will, for their own convenience, return to public transport. Again, with the increasing spread of parking meters

in Central London, fewer cars will park on the streets; this may well mean an increased use of public transport. Many of the cars which are parked all day in London's streets apparently come from distances within seven miles of central London. A majority of long-distance travellers into London probably already travel by rail.

(35) London Transport inform us that experience in several sectors of London has shown that rail traffic increases after modernisation and that part of this increase comes from road traffic. The extension of the Central Line to Woodford and Newbury Park in 1947 produced an immediate increase in rail receipts and it was roughly estimated at the time that, on balance, some 50,000 passengers a day had transferred from road to rail. The electrification of the Liverpool Street/Shenfield line in 1949 had a similar effect. Within a year of its opening, rail receipts had risen overall by 41 per cent and traffic on two alternative bus routes had fallen by some 30 per cent. Operations on two Green Line coach routes working at high frequency with double-deck coaches were reduced by one-fifth as a result. (This drop, however, was not all due to modernisation; some of it can be attributed to a general drop in the use of road services and an increase in private car traffic at that time following a relaxation in petrol rationing.) Some further fragmentary evidence is provided by the results of two police road traffic censuses in 1949 and 1952. Private car traffic from the area served by the Central Line was noted at Stratford Broadway and Ilford Broadway and between the two census years had increased at these points by 19 per cent and 27 per cent respectively. The corresponding increase at all other comparable census points was 40 per cent.

(36) The Victoria Line as it is at present planned would also help to relieve road congestion by providing car parking space for rail travellers at some of its stations. Its contribution in this way is limited, however, for the Line serves an area which is already heavily developed and it is not possible to provide a great deal of car space. At Tottenham (Hale) and Blackhorse Road it would be possible to park 75 and 60 cars respectively and 50 cars could be parked some fifty yards from Hoe Street station. We understand that it might be possible to provide more space at Tottenham (Hale). Opportunities for providing parking space on the Enfield Town and Chingford Lines, which would connect with the Victoria Line, are also limited. It would be possible to provide space for about 30 cars at Highams Park and Chingford and there are tentative proposals, depending on the closure of a goods yard, to increase the space available at Enfield Town station to handle approximately 100 cars. In the past London Transport and British Railways have pursued a vigorous policy of providing car parking space at stations and we were glad to note that

this could be continued in constructing the Victoria Line. We would welcome more space being made available at outer stations on the Line.

(37) On the whole we think that it is reasonable to expect the Victoria Line to attract traffic which at present travels by private car, but, for the reasons given above, we have been unable to quantify this. It is possible, however, to assess the decreases in London Transport's road services. The Victoria Line, by providing a convenient alternative to bus routes, would allow London Transport to reduce their bus and trolleybus services in the area served by the Line. The reductions that can be foreseen at present must necessarily be tentative, but it appears that it would be possible to save some 3·25 million bus and trolleybus car miles in a year. This would mean two thousand less bus trips every weekday. When traffic has settled down in a new pattern after the Line is built it might be possible, we understand, to make further reductions.

Tourist Traffic

(38) One further point which we think should not be overlooked is the fact that the Victoria Line would help London Transport to attract more visitors and tourists in London to the Underground. Because of the complex street system of what is to them a strange city, many visitors and tourists prefer to travel by Underground, with its simpler network of lines and more easily understood maps and directions. By enhancing the attractiveness of the Underground system generally we feel that the Victoria Line would prove a boon not only to Londoners but also to their guests.

III. ESTIMATED TRAFFIC AND FINANCIAL RESULTS

Passenger Traffic Estimates

(39) London Transport have estimated that some 85 million passengers, each travelling on average a distance of about three miles, would use the Victoria Line every year. This estimate is obtained from the expected traffic density over the various sections of the Line (station to station) and the estimated passenger mileage. Measured in passenger miles, total travel on the Line would be 263 million passenger miles. The detailed figures are set out in Appendix V.

The passengers on the Line can be classified in four main groups—new passengers, passengers diverted from other parts of the Underground, passengers diverted from London Transport's road services and passengers diverted from British Railways. London Transport have estimated that the share of each of these classes in the total travel on the Line would be:

	<i>Passenger-Miles</i> (Millions)	<i>Percentage Share</i> <i>of Total</i> (per cent)
New Traffic	78	29·7
Diverted from:		
Underground	95	36·1
Road Services	49	18·6
British Railways	41	15·6
	<hr/> 263 <hr/>	<hr/> 100·0 <hr/>

(40) In making these estimates, London Transport have drawn on their knowledge and experience of Londoners' present travel habits. Thus, in estimating the passengers diverted from other Underground lines, they have been able to use the known numbers of passengers travelling between various points on the Underground. In some instances where, for example, passengers have at present to travel in a roundabout route between two points, and the Victoria Line would provide a direct and faster alternative route, they have assumed that all such passengers would in future use the Victoria Line. In other cases, where the facilities offered by the Line are not markedly better than existing routes, they have assumed that a proportion of the passengers would use the Line.

(41) This method of forecasting cannot, however, be applied throughout. There is no comparable detailed information, such as exists for the Underground, on point-to-point travel on bus routes. Here London Transport, after taking into account journey times, fares, and the results of special *ad hoc* surveys, have estimated the proportion of traffic likely to transfer from bus routes affected by the Line. It has also been necessary to take into account the estimated diversion of traffic to the Victoria Line from the Eastern Region lines that are being electrified. There is no accurate means of estimating the new traffic that would be gained by the Line, although the experience of earlier Underground and British Railways extension and modernisation schemes is a valuable measure. In making their calculations

London Transport have had to use their judgment and knowledge of Londoners' travel habits to a wide extent, but they have done this with due caution; in fact, we think that the number of passengers who might use the Line has been calculated conservatively and it may turn out that it has been underestimated. London Transport have supported their conclusions by explaining to us the methods they have used in reaching them and these seem to us to be reasonable.

(42) At first sight the construction of the Victoria Line and the modernisation measures now in hand on the Enfield Town, Chingford and Bishops Stortford suburban lines appear to be a heavy programme in north-east London and we therefore inquired whether the construction of the Victoria Line might not react adversely on these suburban schemes by drawing traffic away from them to such an extent that their own economic prospects were seriously weakened. British Railways have explained to us that passenger traffic on the Chingford Line is estimated to rise by about 80 per cent and on the Enfield Line by over 100 per cent over the present level. This would mean that the number of passengers from these lines passing through Liverpool Street station every year would rise from $8\frac{1}{2}$ to 16 millions, if the Victoria Line were not built, thereby throwing an increasingly heavy strain on the interchange facilities at Liverpool Street and the Central Line. The construction of the Victoria Line is expected to change this travel pattern by drawing 5 million of these passengers off the suburban services through its interchange stations at Walthamstow (Wood Street) and Seven Sisters respectively, but this would still leave 11 million passengers a year travelling to Liverpool Street, i.e. some $2\frac{1}{2}$ million more than at present. It must be remembered, too, that the Victoria Line itself would further stimulate travel over the outer stretches of these suburban lines by providing a direct link to the West End.

(43) We noted in paragraph 39 that a part of the traffic on the Victoria Line—some 41 million passenger-miles—would come from passengers diverted from British Railways. This loss, however, would be offset partly by gains of 19 million passenger-miles on the Chingford, Enfield and Bishops Stortford lines and on the Southern Region lines into Victoria, especially at off-peak times, from the present modernisation measures and from the stimulating effect of the Victoria Line. This means that there would be a slight loss of traffic—some 22 million passenger-miles—on British Railways suburban lines which would be extremely small when compared with the annual figure of 4,875 million passenger-miles travelled on these lines in 1957. The numbers of passengers using these suburban services will increase gradually in future.

Financial Estimates

(44) London Transport estimate that the capital cost of the Victoria Line is £55m. The break-down of this expenditure is:

	£m.
Lands and easements	2.6
Running tunnels	19.4
Stations	17.1
Equipment of line, rolling stock depot, etc.,	7.4
Plant and overheads	4.0
	<hr/>
	50.5
Rolling stock	4.5
	<hr/>
Total	55.0
	<hr/>

(45) The analysis of this expenditure year by year over the period of planning and construction would be:

	£m.
1st year (planning)	0.75
2nd year (construction)	2.0
3rd year (construction)	10.0
4th year (construction)	13.25
5th year (construction)	16.0
6th year (construction)	9.5
7th year (construction)	3.5
	<hr/>
	55.0
	<hr/>

The average annual capital expenditure on the Line during construction would therefore be some £9m.

(46) These estimates have been calculated at present price levels and, given the large amount of detailed preparatory work that has already been done on the Line, we understand that London Transport do not foresee any technical difficulties that would lead them to be substantially increased. Any future alteration in the present price levels of wages, materials, etc., would of course make it necessary to review the estimates. As we have noted in paragraph 57 below, it may be possible to reduce the cost of the tunnelling works on the Line by using new techniques, and it might be possible to save some £3m. by these methods.

(47) The Victoria Line, with fares at their present levels and carrying the numbers of passengers indicated in earlier paragraphs, would not

pay. It is estimated to run at an annual loss of £2·5m. to £3m. The bulk of this loss comes from interest charges on capital; the rest from a small operating loss of just over £200,000. It must be remembered, however, that the present network of London Transport railways does not meet all its charges either, and indeed has never done so, although it does cover its operating expenses.

(48) The Victoria Line's small net operating loss is estimated as follows. Receipts are expected to be £1,941,000 a year and working expenses £1,341,000, leaving a working surplus of £600,000. But a substantial number of the passengers on the Victoria Line would be diverted from other services, and a reduction of £1,230,000 in receipts on these services—£537,000 on buses and £693,000 on railways—has to be offset against the Line's working surplus. This would produce a net loss of £630,000. But the diversion of traffic would enable London Transport to make savings worth £411,000 in existing services—£355,000 on buses and £56,000 on railways—and this has to be offset against the net loss in receipts. The overall loss on the Line would therefore be £219,000, i.e. $£600,000 + £411,000 - £1,230,000 = -£219,000$.

(49) These figures are based on the various estimates that have been made of the likely amount of traffic on the Line. As we noted above in paragraph 41, we think that the estimates were worked out conservatively, and it is quite possible that more passengers will in fact use the Line. Also, once the Line is built and traffic has settled into a new pattern, the savings from the other Underground and bus services could possibly be larger. Both these factors could reduce, if not wipe out, the operating loss.

(50) The Victoria Line, then, involves the large capital expenditure of £55m. and while it allows London Transport to make some savings in other services, does not produce an overall profit. On financial grounds, accordingly, it is not a very attractive proposition, and you have yourself indicated in replying to Parliamentary Questions in the House of Commons that it has not been possible so far to fit it into the British Transport Commission's capital programme. Naturally we appreciate that this programme must cater for the needs of the country as a whole and that candidate schemes for it must be given some order of priority. But the Victoria Line, with an average annual expenditure of some £9m. spread over some six years and with a maximum expenditure of £16m. in one year would not, we consider, make excessively heavy demands on capital resources.

(51) There are, we understand, two further factors which have to be borne in mind. The first is that the British Transport Commission have requested that the capital expenditure required for the Line

should be regarded as an extra to the expenditure required for the modernisation of British Railways. The second is that the Commission have indicated to you that, if the money is forthcoming, they will proceed with the construction of the Victoria Line and will endeavour by all means to keep London Transport financially self-supporting in spite of the additional burden of interest and other charges. If, however, they are not able to do so, they reserve the right at some future date to present their case to the Government for some assistance or relief. The second factor draws attention to a dilemma facing the Commission in the London area, and especially London Transport. On the one hand they have to provide an adequate and properly co-ordinated system of public passenger transport in the London area. On the other hand they are required to pay their way, taking one year with another. These two requirements may occasionally be inconsistent.

(52) The question of constructing the Victoria Line is an example of the possible strain between these two requirements. It appears to be necessary to have the Line to enable the public transport services in the London area to be adequate. But on the estimates before us the Line is expected to make a loss and so might exert a strain on London Transport's finances. If it is considered that the Line ought to be built it is pertinent to ask whether its expected yearly losses of £2.5-£3m. might not be reduced by charging special higher fares in an endeavour to meet the second requirement of keeping London Transport's finances in balance. It is suggested sometimes that users of new facilities ought to pay the cost of them and so avoid placing additional fare burdens on passengers who do not use them. On the other hand it could be argued that the Line would benefit so many travellers other than those directly using it that any additional financial burdens should be more widely spread. We consider that this is a matter for the Commission to determine subject to the statutory power of the Transport Tribunal to fix maximum fares.

IV. ENGINEERING AND OTHER FACTORS AFFECTING CONSTRUCTION

(53) The construction of the Victoria Line has been sanctioned by Parliament in the British Transport Commission's 1955 Act. These powers expire on 31st December, 1961, and will therefore have to be renewed in the 1960-61 session of Parliament. We hope that there will be no difficulty over this.

(54) If a decision to build the Victoria Line were taken now, the first contracts could be let within about three months' time and the later major contracts in about nine months. The Line could be opened for traffic about five years after the main contracts were let—in other words, from the letting of the first contracts to the opening would take about six years. During this time London Transport would be paying out capital investment moneys without any return, and we accordingly inquired whether it would be possible to open the Line in sections, so that there might be some interim financial return to London Transport and better facilities for their passengers sooner than is expected. This, we understand, is not a practicable proposition. The time taken to open the Line depends on the time taken to complete the reconstruction of Oxford Circus, King's Cross and Euston stations. These are major works, complicated by the need to divert sewers and other public services without unduly impeding road traffic and to avoid interruption of the railway services on the existing Underground lines through these stations. This accordingly rules out any real prospect of completing and opening the Victoria/King's Cross section of the Line earlier than the rest.

(55) London Transport inform us that the reconstruction of Oxford Circus station will be especially difficult, for the engineers will have to occupy by stages and in sections the whole of the surface road space at the Circus. Normally this would be done by a series of occupations of small sections of the surface, so that road traffic is interrupted as little as possible. If all the surface road space were occupied for a substantial time it might be possible to shorten the construction period considerably—perhaps by some nine months, but this would have to be verified later as the precise amount of work needed to divert sewers and so on becomes clearer. In the circumstances we feel that it would be inappropriate for us to recommend, if the Line were to be constructed, that London Transport should be given a period of complete occupation of the Circus, but we hope that it will be possible for ourselves and the other appropriate bodies to examine later whether a greater diversion of road traffic at Oxford Circus to speed the construction of the Line would be possible and justified.

(56) While an earlier opening of the Victoria/King's Cross section would apparently be impracticable, it would be possible, if engineering considerations were all that mattered, to open earlier the outer section from King's Cross to, say, Seven Sisters. This, however, would require the construction of reversing facilities at King's Cross which would not be needed when the Line is completed, and the scheme would accordingly involve London Transport in wasteful expenditure. In any case a section starting at King's Cross would further strain the already overburdened station facilities at King's Cross

without fulfilling in whole or in part the main benefits of the Line set out in paragraph 23. We think, therefore, that this proposal would not help.

(57) The estimates for building the Line are based on the assumption that conventional tunnelling techniques will be used. It is now probable that London Transport will be able to use a method that is both quicker and cheaper. The present tube railways are lined with flanged cast-iron segments bolted together, with a cement filling injected under pressure between this lining and the surrounding soil. With the new methods the lining segments are not flanged and bolted but are forced into the surrounding soil with hydraulic jacks so as to avoid the need for cement filling under pressure. The segments can be made of either cast-iron or pre-cast concrete blocks. The new concrete technique, which saves time and labour, was used in the construction of the recently opened tunnels at Potters Bar on the Eastern Region main line, but it is not possible to say at present whether it would be feasible and economical to use it for tube size tunnels in the soil found under built-up London. We have been told that London Transport have tentatively estimated that if one-half to three-quarters of the Victoria Line could be built by the new method it would save some £3m. on the capital cost. We hope that it will be found possible for new techniques to be used to reduce costs.

V. ALTERNATIVE INVESTMENT TO THE VICTORIA LINE

(58) You have indicated, in replying to Parliamentary Questions in the House of Commons, that you wished to take the advice of the Committee on whether £55m. would pay a better traffic dividend if it were spent on off-street parking or some other project. We have therefore tried to compare the Victoria Line with other desirable projects in the London area which require capital investment and have a bearing on London's travel problems. The merits of the Line have been weighed up against other possible railway works, road schemes and the provision of off-street parking accommodation.

Underground Investment

(59) The London Plan Working Party, which reported to the then Minister of Transport in February, 1949, recommended that Route C, from which the Victoria Line is derived, should be given highest

priority in the list of necessary and desirable new railway lines in the London area. We think that this advice is still sound and we have therefore excluded from our examination of investment alternatives the other proposals for underground construction made by the Working Party. We would emphasise, however, that, if the Victoria Line were not built, it would be necessary for London Transport to carry out a series of schemes scattered over the Underground in central London to improve facilities and enable the system to handle peak hour traffic more easily and expeditiously. The cost of the schemes, which include station rebuilding at Oxford Circus, Euston and King's Cross and the duplication of a section of the District Line, might be of the order of £30m. But they cannot be regarded as an effective substitute for the Victoria Line (although the station improvements would be included in the Line), since they would not provide any new direct links, and their chances of attracting new traffic would be slender. Although they may be said to be necessary in the absence of anything better, they would not enhance the traffic potential of the Underground as the Victoria Line would do, and we do not consider that the Victoria Line should be sacrificed for them.

(60) We also considered whether some modified form of the Line could pay a better traffic dividend. The Line falls naturally into three parts—Victoria to King's Cross/St. Pancras; King's Cross/St. Pancras to Seven Sisters and Seven Sisters to Walthamstow (Wood Street)—and it seemed useful to inquire whether the construction of one section or two adjacent sections might prove a cheaper and adequate alternative to the complete Line. At first sight the construction of a line from Victoria to Seven Sisters seemed worth considering since it would provide the much needed link between Victoria and the northern main line termini, relieve the most heavily overloaded section of the Piccadilly Line, and give a connection with the Enfield suburban line into Liverpool Street which is now being electrified. London Transport advise us that the estimated capital cost of this scheme would be £45m., i.e., £10m. less than the complete Victoria Line. The scheme, however, has serious disadvantages. It would not allow the Line to draw new passengers easily from the north-eastern suburbs, since travellers from there would still have to make the journey by road to join it at Seven Sisters. Also, since it would not connect with the Eastern Region lines at Tottenham and Wood Street and so be able to draw passengers from them, the Line would give only partial relief to the Central Line from Liverpool Street. This proposed section would lose slightly more in net traffic receipts than the full Line, but since its capital cost is £10m. lower, interest charges would be correspondingly reduced. The section therefore has a small financial advantage, but we feel that this is more than cancelled out

by the fact that the shorter section would not be so effective as the full length Victoria Line in providing the much-needed north-east/West End link and in relieving the Central Line at Liverpool Street.

(61) The only other reasonable alternative is to construct the Victoria/King's Cross section. This would provide the interchange facilities that are needed in Central London and give a direct link between Victoria and the West End, and between the West End at Oxford Circus and the northern main-line stations. It would also relieve the central section of the Piccadilly Line, and the section of the District and Circle Lines between Victoria and Charing Cross. But against this must be set the disadvantages that this short section would not relieve the Central Line at all and would not give the necessary north-east/West End link. A further disadvantage is that it would be necessary to connect the section with the Piccadilly Line at King's Cross to allow empty rolling stock to be run into and out of the Line over the long distance to and from the Piccadilly Line depot at Cockfosters. This means, in effect, that a proportion of the mileage run by the trains would not earn revenue.

(62) But neither of these curtailed alternatives, as we noted above in paragraph 54, would apparently be completed in much under the six years that would be required for the complete Line so that they offer no real advantage in construction time. Also, it would not be practicable to construct and operate a section going north-eastwards from King's Cross and, as this possible variation of the Line would not help central London at all (except perhaps by giving some slight relief on the Central Line) we consider that it, too, is unacceptable.

(63) We think, therefore, that the Victoria Line ought to be constructed as it is planned from Victoria to Walthamstow; to shorten it would have more disadvantages than advantages.

(64) We also examined, in this context, a scheme of Underground development submitted to us by a private individual. This proposal would not provide for new tube construction between Finsbury Park and Walthamstow. Instead, there would be an 'outer circle' route, using the present Northern City Line tracks between Finsbury Park and Moorgate; thence to Bank in a new tunnel, from Bank to Waterloo via the Waterloo and City railway and then from Waterloo to Victoria and South Kensington in a new tunnel. In the central area the planned route of the Victoria Line would be followed between Victoria and King's Cross. It was suggested that the new route need not necessarily be in double tunnels; single tunnels using tidal flow techniques in the morning and evening rush hours would suffice. The scheme, it was claimed, would be cheaper than the Victoria Line. We were impressed by the amount of work which had clearly been

devoted to drawing up these proposals, but we are convinced that there are strong reasons against accepting them as a substitute for the Victoria Line. In addition, we were not at all sure that the proposed new route would be cheaper than the Victoria Line, since it would involve a large section of new Underground tunnels in central London and we were not satisfied that what are described as tidal flow techniques are appropriate for Underground lines carrying heavy two-way traffic in the heart of London. We considered that the proposed scheme as put to us would not be a suitable alternative to the Victoria Line.

Road Investment

(65) In comparing the Victoria Line with investment in road works we were faced at the start with the problem of defining the road works that should be considered. Since the construction of the Victoria Line has not been authorised we felt that a reasonable comparison could only be drawn between it and road works which are known to be needed but which have not yet been authorised for inclusion in the current and future construction programmes. This means, in effect, that we have excluded from our comparison road works, such as the Park Lane scheme, which are now in hand. A further problem was to decide which of these many outstanding and desirable road works should be compared with the Line. We decided that this would be done most usefully in two ways—first, by selecting £55m. worth of proposed schemes from the priority list for the London area and, second, by taking a selected list of schemes, again worth £55m. in roughly the area served by the Line. (The two lists are in Appendix IV.) It should be pointed out that £18m. worth of schemes are common to both lists and that the remaining £37m. worth in the second list generally carry a lower priority than the remaining £37m. worth in the first list. The comparison between the Line and road schemes would therefore be made on both a broad and a narrow front. We considered that this was a reasonable course to follow, for while the Line would have a greater traffic impact on the area through which it passes than elsewhere, it would also generally benefit the whole of the railway system in London, particularly in the central area. The effects of road works can accordingly be compared most fairly, we think, using the method we adopted.

(66) Ideally the comparison between the Victoria Line and road schemes should be made on an economic basis. The Committee, however, has been unable to do this, since the necessary data for making such a comparison do not exist. It would be necessary to know, both for the roads and railways, the present and anticipated future pattern of traffic movements and adequacy of existing routes

and terminals for the traffic. This information exists in some detail for the railways, but not for the roads, and to obtain it would require a series of origin and destination surveys for all types of road traffic, and surveys of existing traffic conditions, of the rates of increase of different classes of traffic in recent years, and of land values. The results of these surveys could not unfortunately be made available for some time.

(67) In the present state of knowledge, therefore, we are unable to compare the Victoria Line with road schemes from an economic point of view and have had to compare their merits on the basis of their general value to traffic. In examining the various road schemes we were struck by the fact that many of them are urgently needed now to handle the current volume of road traffic. Another feature which has impressed us is that the road schemes, while necessary and desirable in themselves, cannot be regarded as a substitute for the Victoria Line. Taking, in the first place, the broad list of schemes, we found that many of them lie outside the area directly served by the Victoria Line and it became clear to us that the traffic they would assist could, at best, be influenced only marginally by the construction of the Line. But there is no doubt that these schemes are needed if road traffic is to have any hope at all in the future of moving easily into and out of London. Taking the narrower comparison, the schemes which would directly affect the area served by the Line would, in some cases, materially help the flow of traffic between east and north-east London and the West End and to a very limited extent perform the job done by the Line in providing faster travel between these points. We noted in paragraph 65 that the works which would directly affect the area served by the Victoria Line carry generally a much lower priority than the works in the first list. While in this report we are concerned with the Victoria Line we have also had to bear in mind that our terms of reference cover road congestion. We consider that the schemes in the first list are necessary to help the free flow of road traffic and increase the road system's peak hour capacity (which in terms of passengers is naturally far below that obtainable on the suburban railways or Underground) by easing the most constricted points. These schemes would also help improve the operations of London Transport's road services. We consider that they must be implemented.

(68) We also considered the relative speed at which the Victoria Line and the highest priority road schemes could be constructed. As we noted in paragraph 54 the Line could be opened for use about six years after it was authorised. The rate at which road schemes are authorised and completed depends to a large extent on the amount of money available annually for them. At the present level of

expenditure—about £6m. a year—road schemes worth £55 m. would take about nine years to build. To this there has to be added some time for various statutory procedures and land acquisition and on the information available to us it seems that it would be necessary to add another two years for this. To authorise and complete the most urgent road works would accordingly, under present conditions, take about twice as long as the same process for the Victoria Line. A larger yearly amount of investment on roads would, of course, speed up the programme.

(69) A minor point of contrast between the Victoria Line and road schemes is the effect they would have on road traffic when they are being constructed. Road schemes, while they ultimately help traffic flow, usually produce even more congestion while the work is being done. The Victoria Line, on the other hand, by being underground, will not affect surface traffic except at one or two points, for example, at Oxford Circus, which we have mentioned in paragraph 55.

(70) We think that London's travel problems cannot be solved by investment in either Underground or road facilities alone. The problems that the most urgent road improvements are designed to solve cannot be helped materially by the construction of the Victoria Line. Similarly, to carry out these road improvements would not remove the need for the Line, for they would not, for example, give the fast direct link between Victoria and the northern main line termini or between the West End and north-east London. Road improvements, on the other hand, could assist the movement of goods as well as passenger traffic. The Line and the road improvements are complementary in meeting demands for travel in London and they are all required.

Investment in Off-Street Parking Accommodation

(71) It might appear that the investment of £55m. in off-street parking facilities could make a decisive impact on London's road traffic problems, since for that sum it would be possible to provide space for all the cars which are at present parked all day in the streets of the central area. In fact, this space could be provided for about £45m. It would speed up surface travel for everybody if all the streets were cleared of the parked cars which now clog the streets for a large part of the day. But to provide off-street space only would still leave unsolved the problems of congestion caused by heavy road traffic at intersections and along the routes into and out of Central London during rush hours. These call for physical road improvements and the skilful application of traffic engineering techniques. By itself, provision of off-street parking would be an ineffective measure; the vacant spaces in the garages now available show that

the alternative of free parking on the streets must be stopped by comprehensive and fully enforced methods of control. Investment in garages must therefore be linked with the rapid extension of controlled parking zones. Moreover, the financing of extra garages remains, under Government policy which you have recently reaffirmed, entirely in the hands of local authorities and private enterprise and will not therefore compete directly with either expenditure on roads, which will come predominantly from central funds, or on railways, for which the Government lend the money required. In fact, the profits of local authorities under parking meter or other schemes for charging for parking on highways must be used for providing off-street parking accommodation. This form of investment may be expected to grow naturally as the proper control of street parking is applied, and we see no reason why investment in the Victoria Line should be affected by this process in any way.

VI. CONCLUSIONS

(72) The Committee have examined the Victoria Line, not merely as a project on its own merits, but also against the background of present day travel conditions in London. We have shown that the vast majority of workers coming into central London use public transport. We have also tried to foresee the future pattern of travel in London, and to assess the effects of the Victoria Line in meeting future demand. We think that it is reasonable to expect that in years to come by far the greater number of daily travellers into and about central London will continue to use public transport, especially the railways. As part of our general policy we consider that public transport facilities should be improved and kept up to date to encourage their use and to cater for the continued demand.

(73) Our first main conclusion is that the Victoria Line is essential to meet present and expected future demands for travel on the Underground system. It would benefit thousands of Londoners and would enhance the value of the Underground by filling a gap in the present network. We are satisfied that the Line is the most effective means of relieving the severe peak hour congestion on many of the present Underground services and of providing Londoners with quicker and more direct travel within the central area of their city and from the north-eastern suburbs to the important business and commercial quarter in the West End. The Line will also improve the rail links between Victoria, with its extensive network of rail services to the southern suburbs and coastal towns, and the West End. The

Line will not only meet present needs; by linking the northern main line termini with the West End and Victoria it will help to handle the expected increased numbers of passengers using these stations as British Railways' modernisation schemes are completed. It will also be able, we think, to attract passengers from road to rail and to help relieve congestion on the roads. This view that the Line is necessary is not new; it has been expressed over the past few years by several responsible and knowledgeable bodies and individuals. On this point we entirely agree. We should mention here that we have been informed by representatives of local authorities in the area served by the Line that they and large sections of public opinion in London strongly support the Victoria Line.

(74) Our second main conclusion is that the construction of the Line should be started as quickly as possible. As we have mentioned, to fulfil its proper functions the Line should be constructed as it is at present planned from Victoria to Walthamstow. To do this would take some six years before it would be opened for public use. If it were authorised before the end of this year, it could begin to be used about the end of 1965. There are limits to what can be done to ease Underground congestion significantly meanwhile. While it is true that the new rolling stock now on order for the Piccadilly and Central Lines will provide some appreciable additions to accommodation on these lines, this will still not lower the present overload figures to the limits we consider reasonable. Additional passengers will also be joining the Underground from the suburban lines, which are now being electrified, from the end of next year onwards. This forecast in no way implies that we think the staggering of working hours will not help to ease congestion. There is no doubt that staggering produces valuable local relief, and we intend to pursue it as vigorously as possible, since it appears to be the only feasible interim measure for helping to spread the peak load on the Underground. But it can only make a limited contribution. Something more is required to meet long term needs. We have no evidence to suggest that the volume of travel to and from work in central London and congested travelling conditions will decrease in future; on the contrary, all the available evidence shows that the amount of daily travel will grow and travel conditions become worse if the Underground is not expanded and improved.

(75) We do not think that the purposes achieved by the Victoria Line could be met by the more intensive use of buses or by the present planned schemes for physical road improvements. Bus services in the central area are already badly handicapped by traffic congestion and tend to run irregularly. A more intensive bus service would still suffer from these handicaps. Also, bus services are necessarily slower

than the Underground, and are more expensive for regular travellers over longer distances. They do not therefore attract the peak hour passenger travelling over longer distances—indeed, they are not primarily designed to do so, but to cater for the short distance traffic and to act as feeders to and from the railways which are ideal for long distance travel. We noted in paragraph 67 that the most urgent improvements planned for London would, at best, affect only marginally the passengers who might travel by Victoria Line. This emphasises the fundamental fact that road and rail serve different purposes and play distinct roles in meeting London's travel and traffic needs. Both systems are essential, and we think that their development and improvement should both go forward. We do not consider that the present planned level of investment in the road programme should be sacrificed to meet the cost of the Victoria Line. Equally we do not consider that the Victoria Line should be sacrificed to find additional investment in road schemes.

(76) This policy, we recognise, must lead inevitably to heavy capital investment in both road and rail facilities. Nothing is easier than to recommend spending public money, but we think that this investment, as far as London's travel and traffic problems are concerned, is not only inescapable but justified. There has been no major Underground construction in central London for over 50 years. During that time the peak hour pressure on the system has increased to its present intolerable level and will continue to grow in the near future. As a result of the expansion of business activity in the West End, passengers now want to travel between points which have no direct rail connections. Similarly, until the new London Wall was opened a few days ago, no new major roads had been built in inner Central London since before 1914. Many roads and intersections in the central area are now inadequate to deal with the present weight of traffic, let alone any future increase. It is no longer possible for the arrears to be overtaken and made good by inexpensive temporary expedients and palliatives alone, necessary though these are. Transport facilities need to be kept up-to-date to meet expanding and altered demands, as we observed in paragraph 73, and this can only be done by investment in tracks (whether rail or road) and rolling stock. We are glad to note that roads in central London are now being improved and developed in a progressive programme at an annual rate of about £6m. and we hope that this will be accompanied very quickly by the equally necessary expansion of the Underground.

(77) We recognise, however, that the Victoria Line is not an attractive commercial proposition taken on its own and measured solely in financial terms, for it is expensive to build and on present estimates would run at an annual loss of between £2·5-£3m. But there is no

doubt that it is required, and would be well used. As we have mentioned in paragraph 52 this exemplifies the possible strain that may occur at times between two duties of the British Transport Commission—on the one hand to provide an adequate and properly co-ordinated system of public passenger transport in the London area and on the other to pay their way taking one year with another. To construct the Victoria Line would further enable the Commission to carry out the first of these duties, but it might in future adversely affect their ability to carry out the second. In drawing attention to this we have made a passing reference to fares. We have not attempted to review this question of fares in any detail, however. This is a matter for the Commission to determine, subject to the statutory power of the Transport Tribunal to fix maximum fares. We do not feel competent to make any recommendation on fares, but we are firmly of the view that the currently anticipated annual loss on the Line should not be a reason for not authorising or deferring its construction. The loss is a small amount—between 3·5 per cent and 4 per cent—in the context of London Transport's total receipts of £84·4m. in 1957 and £75m. in 1958. We cannot translate into money terms the results of the inconvenience, irritation, overcrowding and delay that already occur on the Underground in the peak hours, but we are convinced that, if this could be done, it would more than cancel out the strictly financial objections that could be raised against the Victoria Line.

(78) In supporting the plans for the Victoria Line we do not claim that the Line will solve every congestion problem on the Underground—indeed, no one project could be expected to do this. The Line is so planned that it will, amongst other things, relieve congestion on several of the most heavily pressed sections. But it will not have a profound effect on the crowded westbound section of the Piccadilly Line from Green Park to Earls Court and on the westbound section of the Central Line from Oxford Circus. Again, while the Line will help to relieve pressure on the West End branch of the Northern Line between Charing Cross and Euston, the new interchange facilities at Euston will probably encourage more passengers to use the Northern Line between there, Camden Town and the outer sections towards the north. The Victoria Line is accordingly of great benefit to the efficiency of London Transport and the comfort of its passengers but it is not a universal cure for every difficulty on the Underground. It is probably the only piece of major construction required for some time to help deal with crush hour problems in central London on the Underground. But we do not regard it as the coping stone to the structure. Some congestion problems will still remain to be investigated and, if possible, solved.

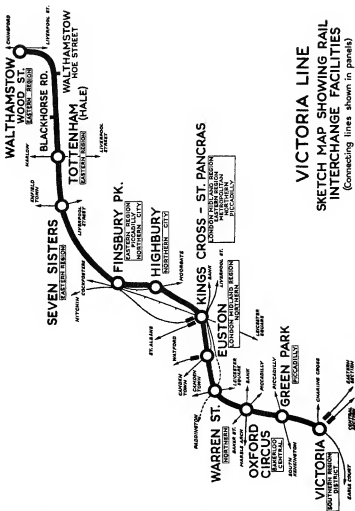
(79) We recommend that the Victoria Line as it is at present planned should be authorised forthwith and construction put in hand as quickly as possible. We recognise that the Line is not *prima facie* a profitable commercial investment as things are. But we believe that the improvement that the Line could bring to the public transport services in London is necessary and that this improvement would confer large benefits on the travelling public. This decision has only been taken after the most exhaustive examination of all the many factors involved. We are under no illusions about the present serious state of the British Transport Commission's finances or about the extra strain which the Victoria Line might throw on them. Against this, however, we balance the fact that, if London, as the greatest trading and commercial centre in the country, is to have transport facilities adequate to meet present and future needs then some new Underground construction is urgently necessary. The Victoria Line deserves, we think, the highest possible priority and we have no hesitation in putting forward our recommendation that it should be built and a start made on construction in the very near future.

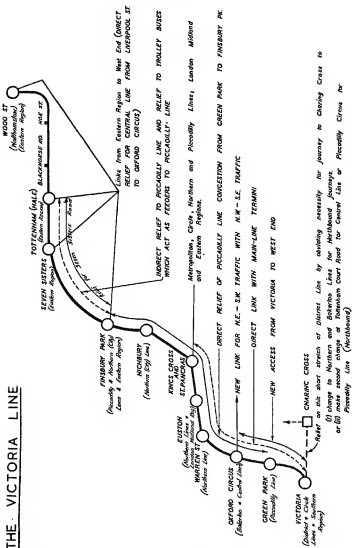
Signed on behalf of the Committee,

ALEX SAMUELS,
(*Chairman*)

W. W. Scott
(*Joint Secretary*).

28th July, 1959.





APPENDIX III

New Interchange and Station facilities

Eleven of the thirteen stations will provide interchange facilities with other Underground and surface lines; the stations and facilities to be provided are summarised below. At all tube stations there will be escalators between ticket hall and platforms.

Victoria

New sub-surface ticket hall with escalator and subway interchange with the District and Circle Line platforms and with the Southern Region terminus.

Green Park

Subway interchange with Piccadilly Line.

Oxford Circus

Reconstruction and enlargement of existing sub-surface station; cross-platform interchange with the Bakerloo Line; subway interchange with the Central Line.

Warren Street

Escalator interchange with Charing Cross branch of the Northern Line.

Euston

Reconstruction of existing station and replacement of lifts by escalators; 'reverse-direction'* cross-platform interchange with City branch of Northern Line, and escalator and subway interchange with West End branch and Euston main line terminus.

King's Cross/St. Pancras

Enlargement of existing ticket hall; subway interchange with Northern and Piccadilly Lines, and escalator interchange with the Metropolitan Line and King's Cross and St. Pancras main line termini.

Highbury

Surface ticket hall moved to a new site and lifts replaced by escalators; convenient interchange with Northern City Line which will be absorbed by the Great Northern suburban system of the Eastern Region on its electrification; interchange with London Midland Region North London Line.

* This means that, although there is cross-platform interchange, the Victoria Line trains will leave Euston in what appears to be the reverse direction to that of the City Branch of the Northern Line.

Finsbury Park

Cross-platform interchange with Piccadilly Line; interchange with Eastern Region surface station (Great Northern suburban services); Northern City Line trains transferred to top level surface station.

Seven Sisters

New station with sub-surface ticket hall beneath Tottenham High Road between Broad Lane and Seven Sisters Corner; interchange with Eastern Region Enfield Town Line.

Tottenham (Hale)

New station with surface ticket hall adjoining Eastern Region Cambridge Line station.

Blackhorse Road

New station with surface ticket hall west of Blackhorse Road at its junction with Forest Road.

Walthamstow, Hoe Street

New station with surface ticket hall west of Hoe Street at its junction with Walthamstow High Street.

Walthamstow, Wood Street

Reconstruction of existing Eastern Region surface station; cross-platform interchange with the Eastern Region Chingford Line.

APPENDIX IV

I. List of road schemes of highest priority in the London area with a total estimated cost of £55 million

	<i>£m.</i>
Route No. 11, Ludgate Circus to Aldgate High Street . . .	9.307
Western Avenue Extension, Lancaster Road to Edgware Road .	4.140
Angel Intersection	1.650
King's Cross Intersection	3.720
Strand Underpass, Waterloo Bridge to Kingsway	0.600
Victoria Station Area	2.300
Bricklayer's Arms	0.560
Knightsbridge/Sloane Street, Stage II	4.450
Vauxhall Bridge, Northern approach	1.720
Vauxhall Cross	3.000
Brixton Road (South of Stockwell Road)	1.060
Blackwall Tunnel, Southern approach	1.820
Holborn Circus	1.770
Tottenham Court Road, Southern half	2.500
South Circular Road, Rushey Green	5.300
Rotherhithe Tunnel, Northern approach	1.020
New Cross By-pass	3.100
Dalston Junction	1.400
Wandsworth Bridge, Southern approach	1.750
Latimer Road, Finborough Road route, Northern section .	3.833
	<hr/>
	55.000
	<hr/>

II. List of road schemes within the area of influence of the Victoria Line with a total estimated cost of £55 million

	£m.
Norwich Radial—section from North Circular Road to Eastern Avenue Extension	3·00
Eastern Avenue Extension (part)	2·00
Great Cambridge Road continuation	1·20
Hackney Road—Eastway Route	6·05
Old Street, Great Eastern Street to Hackney Road	0·90
Dalston Junction	1·40
King's Cross Intersection	3·72
Pentonville Road—City Road	2·40
Marylebone Road and Euston Road widening	1·39
Tottenham Court Road, Northern half	2·04
Tottenham Court Road, Southern half	2·50
Stamford Hill—Route 36 to Hackney Road (Alternative to A.10)	6·65
Stamford Hill—Route 39—(W. India Dock Route) to Mile End Road	5·33
Rotherhithe Tunnel, Northern approach	1·02
Blackwall Tunnel, Northern approach	1·02
Victoria Station Area	2·30
Strand Underpass, Waterloo Bridge to Kingsway	0·60
Angel Intersection	1·65
Holborn Circus	1·77
Kentish Town Road, Fortress Road—Junction Road	3·78
Knightsbridge/Sloane Street, Stage II	4·45
	<hr/>
	55·17
	<hr/>

Note.—The completion of Route 11 (£9·307m.) is not included.

APPENDIX V

Victoria Line—Traffic Estimates

Stage	Passengers	Passenger- miles
	(millions per year)	
Victoria—Green Park	31	22·01
Green Park—Oxford Circus	32	22·72
Oxford Circus—Warren Street	43	24·94
Warren Street—Euston	42	19·74
Euston—King's Cross	35	16·45
King's Cross—Highbury	32½	49·725
Highbury—Finsbury Park	29	35·09
Finsbury Park—Seven Sisters	22	43·12
Seven Sisters—Tottenham (Hale)	14	8·54
Tottenham (Hale)—Blackhorse Road	11	10·23
Blackhorse Road—Hoe Street	8	7·28
Hoe Street—Wood Street	4	3·44
	303½	263·285